
TEAMSOA, INC.
QUICK OVERVIEW

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Overview

In September 2004, the San Diego-based Research and Development wing of Blue Titan, Inc. broke off to form their own Service Oriented Architecture (SOA) consulting boutique, named appropriately, TeamSOA. Since its inception, the staff of eight has been providing both knowledge and implementation expertise for several key clients, including Yahoo Overture, Citibank, Pfizer, Accredited Home Lenders, Ameriquest, Science Applications International Corporation (SAIC), Price Waterhouse Coopers (PWC), Maxjet (formerly Skylink Airways) and others.

Knowledge

TeamSOA brings lessons learned with distributed, high availability services to client's IT architecture. With over 20 development years around SOA, questions on Quality of Service, Identity Management, Security, Enterprise Service Buses, Web Service Brokers and Management can be answered from solid experience, rather than from best guesses and vendor-driven hype. We provide a perspective and a framework of discussion for many SOA concerns: How much Network policy should be created and enforced on the endpoints, versus the Network itself? How do you prevent single point of failure? Does "once and only once" guaranteed delivery suffice, or is "at least once" delivery good enough? Other key challenges include handling transactions across distributed endpoints, tracking run-time issues when applications are loosely coupled, and controlling distribution of requests and access to services.

Implementation

Our team has had exposure to a large number of emerging tooling and platforms for building Web Service applications. We have extensive experience with all aspects of the BEA WebLogic Platform: Workshop for building new services, WebLogic Integration (WLI) for workflows and business process management, Liquid Data for exposing disparate data sources as Web Services, and Portal for rapidly adding Web applications to corporate intranets. We have built Web Services based on Microsoft .Net, including stand-alone and Web applications. Beyond the basic development toolkits, we have worked with several security and identity management vendors, such as Oblix, Netegrity, and DataPower, to build SOA solutions.

Having developed Blue Titan's Web Services Management product, we thoroughly understand the benefits and limitations of such software, and have had exposure to much of the competition, including Digital Evolution, Amberpoint, Actional, and WebMethods. In terms of messaging vendors, we've worked with TIBCO, MQSeries, Talarian, Sonic, and have followed the evolution of

messaging to the Enterprise Service Bus, especially Sonic ESB; we look forward to BEA's Quicksilver offering, which adopts many Network Director concepts. We also have experience with several open-source ESB solutions, including JBossMQ, and ActiveMQ.

Prior to building Network Director, we developed Web Services Orchestration product, which won the CONNECT "Most Innovative New Product" award in 2001. Through its creation, we gained intimate knowledge of several of the Web Service standards such as BPEL4WS, XPATH, XSLT, WSDL, SOAP, WS-Inspection, WS-Addressing, WS-Reliable Messaging, WS-Security, WS-Policy, UDDI, as well as how to meet WS-Interoperability guidelines.

We have written persistence layers on top of relational databases, such as Oracle, DB2, Microsoft SQL Server, and MySQL, LDAP-based directories, and Berkeley-based hash tables, and the file system. Although we have used EJBs, our evaluation of the various vendor offerings found several performance issues with them. We've used Database Controls, JDO, JDBC, and have relied on well-established open-source efforts, such as Castor JDO, and Hibernate, for both client and product development work.

Quality Assurance and Deployment

As part of ensuring that no single point of failure exists in the architecture or process, we've defined best practices for testing and deploying Web Services. Several clients have hired us for training and education of existing QA and operation teams. Our QA guideline involves verifying Web Service functionality using Parasoft SOAPTest and Mindreef's SOAPscope, and capturing Web Service requests and responses into "workspaces" which can be played back for regression testing. We also have employed open source tooling, such as our in-house VeloMeter¹ product, and the Perl Apache::Bench module to perform load testing.

At deployment, we describe how different parts of the SOA should be configured and where they should be placed, with respect to the firewall, VPN, load balancers, routers, etc. We've helped customers come up with processes for tracking down difficult to resolve problems that occur with loosely coupled systems, enabling operations to respond rapidly to these potentially devastating production issues. Of course, our architecture and testing guidelines emphasize catching such issues during QA and staging, before new IT functionality is brought into production.

¹ See <http://www.shahinaskari.com/velometer>

Projects

Web Portals, Usage Tracking and Rate Limiting of Web Services

Our group was involved in the creation of a usage tracking and rate limiting system for one of the largest Web portals on the Internet. Our distributed Web Service broker was heavily customized to enable limiting of web service calls to a bid system for keyword advertising. Prior to our solution, heavy “last second” bidding by partners resulted in an overwhelming and crippling number of web service calls, where the best price for a bid was often awarded to the partner with the best connectivity to the bid system, rather than the optimal price. Our system governs the web service usage, allowing a given partner only a set number of bids per day and a maximum number of bids per minute.

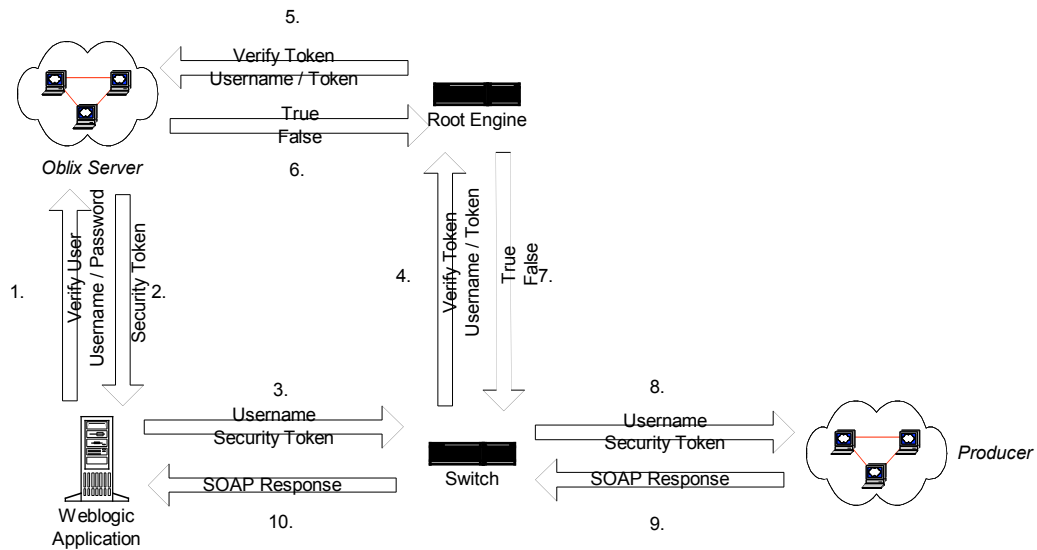
- Tracks usage by user, enforces rate limiting policies
- Handles 40+ million transactions / day
- Adds < 10 msec of overhead to response time (per request)
- Enables configuration management from a single point, without introducing a single point of failure.
- The solution scales very effectively, replicating usage information across all broker nodes on the network.

Financial Services, Core SOA

At Accredited Home Lenders, TeamSOA is responsible for implementation and exposure of core business objects and processes. Web Services based on the Mortgage Industry Standards Maintenance Organization (MISMO) schema are being developed using best-of-breed tooling. After a detailed evaluation of several solutions, including Microsoft SQLXML, and Informatica PowerCenter, we decided to use BEA’s Liquid Data product for handling XQUERY transformations between the databases and target schema. TeamSOA is also working on building several BEA Portlet applications that will consume SST Web Services, via a Web Services broker. BEA WebLogic Integration (WLI) workflows are being created to link various business processes exposed as Web Services.

Pharmaceutical, Security and SOA

At one of the world’s largest pharmaceutical companies, our group was involved in the implementation of a Web Service broker for governance of web services. As part of the implementation, we integrated with the company’s existing security mechanism based on Oblix, a general outline is shown below:

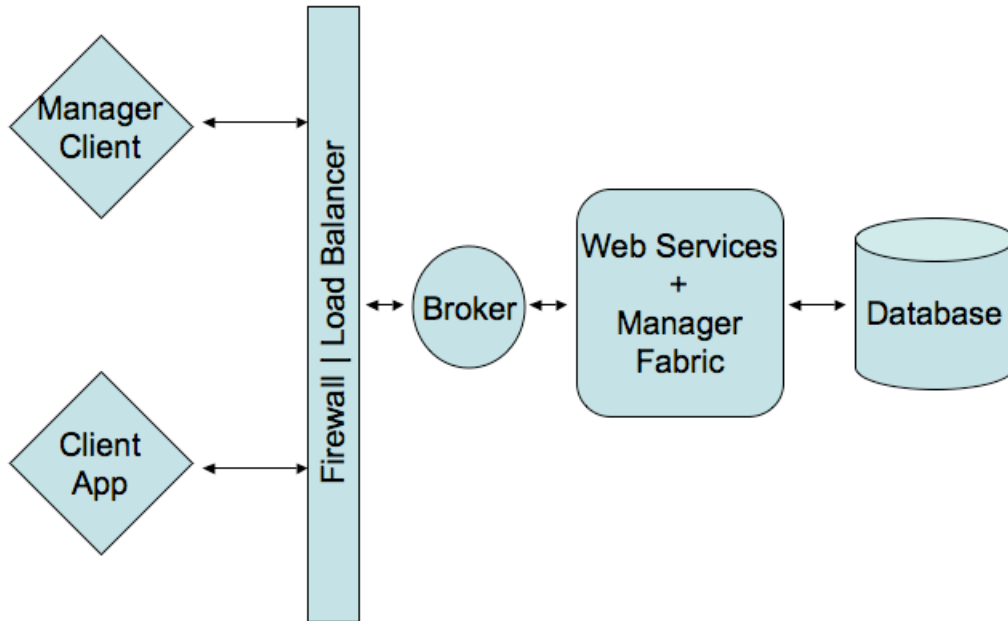


SOA Management Agent

In 2005, TeamSOA ported SOA Software’s Management Point Agent to BEA, exposing web services required for listing, managing, and un-managing HTTP and JMS-based web services. Much of this port required intimate knowledge of the internals of BEA’s configuration management bean framework, as well as a strong understanding of Java Web Service standards such as JAX-RPC.

Web Services Management Broker

After receiving series A funding from Draper Fisher Jurvetson in January 2001, the team began development of our third product offering, Network Director. Network Director solved SOA challenges around configuration management, which are an expected side effect of loosely coupled environments. We adopted a highly distributed, and scalable approach based on fundamental SOA principles: open standards, simple protocols, no single point of failure, lightweight endpoints, allowing the Network to handle security, monitoring, policy, rather than the application developer.



All features of the SOA are exposed as Web Services (Manager Fabric). Essentially, Web Service requests, with an optional WS-Security header, are distributed across a farm of Web Service Brokers, which determine if the user has access to the service. After validating the user for a specific Web Service, the Broker proxies the request to an endpoint, using the configured routing algorithm, keeping track of response times, creating events for endpoint down, or faults, and monitoring and enforcing service level agreements (SLAs), usage limits, and policy.

As Manager Fabric Services are called, they retrieve, and update network configuration management parameters stored in a highly available database. The software was built to work with several enterprise class databases, including Oracle, Microsoft SQL Server, IBM DB2, and MySQL.

The beauty of the architecture is that all Web Service requests, even those that are needed to configure and maintain the Network, are handled by the same mechanism. Extending or replacing the Manager Fabric functionality is a matter of adding additional Web Services, which can be built using any toolkit that supports the creation of doc-style, SOAP over HTTP Web Services. The Manager Client GUI, or any client (Client App) with proper credentials, is able to call the Manager Fabric to modify the configuration parameters of the Network.

Web Services Orchestration

Our development team's knowledge of Service Oriented Architecture began in 1999 with the creation of VelociGenX, which later won the prestigious California CONNECT's "Most Innovative New Product" award in 2001. VelociGenX leveraged the latest Web Services standards, facilitating the creation of doc-literal, WS-I² compliant, WSDL defined Web Services, accessible from any client supporting SOAP over HTTP. The software was designed to "wrap it, link it, run it", or more precisely, wrap existing applications and data-sources with XML interfaces, link them together into a processing pipeline using XSL transformations and basic flow operations: branching, looping, conditionals, and run them on our VelociGen application server.

² See the Web Service Interoperability Organization: <http://www.ws-i.org>

Team Biography

Alex Shah, Architect

Designed and implemented Web Service Oriented Architecture (SOA) for Blue Titan's Network Director, Data Director, and Studio products. The architecture implements WS-Policy, WS-Security, and WS-Routing standards and a distributed, scalable, fault-tolerant, low-overhead routing approach to enable access control, authentication, monitoring, logging, notifications, load-balancing, fail-over, service level agreements, and performance-metrics for WSDL SOAP Web Services.

- Took "hands-on" approach in porting Network Director from 200,000 line, pattern-oriented Java application to a 30,000 line, service-oriented Java application, leveraging open-source toolkits (Castor, JDO, LDAP, Thinlet, JFreeChart, Apache Axis, Xerces, Jakarta Commons), and adopting Web Services.
- Reduced headcount in half and increased productivity of staff by centering R&D in one location and providing an environment where innovation, creativity, and reducing coding time is rewarded. Met deadlines and kept R&D under budget.
- Answered RFPs; provided support for POCs; participated as a speaker and submitted white papers at industry conferences and workshops.

Built an SOA using Java, XML, C++, Perl, TCL/TK to create award winning VelociGenX product, a platform for developing Web Services on top of existing data and applications (ORACLE, DB2, MSSQL, SYBASE, LDAP, MySQL, Postgres, flat file, MQSeries, TIBCO, in-house Java, C++) without custom coding. The software included a "visio-like" service flow creation environment and XPATH transformation engine to wrap, link, and run legacy applications, exposing their interfaces as WSDL with SOAP over HTTP bindings.

- Formed strategic alliances with Sun Microsystems, Netscape Communications, Zeus Technology, C2Net, PSINet, Earthlink and others to increase distribution and usage of VelociGen technology.
- Recruited, trained, and managed development and support teams, growing from 1 to 30 employees.

Wrote Binary Evolution's flagship product VelociGen (C++, Threads, Sockets). VelociGen is a high performance application server which allows developers to rapidly create web applications for processing dynamic content from SQL databases, forms, XML, etc. using a mix of high-level XML, XSL and scripting (Perl, TCL). Ported VelociGen to UNIX, Windows, Netscape NSAPI, Microsoft ISAPI, Apache API, and FastCGI.

Shahin Askari, Architect

Shahin Askari has lead in the design and development of two SOA based distributed applications deployed to Fortune 500 companies today. He was the 2nd hired employee, and has shown excellent project management skills as well as a commitment to deadlines while delivering feature full, robust applications founded on simple, yet elegant designs. He has extensive knowledge of many standards in the SOA space as well as extensive usage of various SOA tooling and libraries, including Castor JDO/XML, Axis, Apache commons/Jakarta projects, a variety of SOAP toolkits including BEA WebLogic/Workshop, Microsoft .Net, Perl SOAP::Lite as well as database technologies including Oracle, MSSQL, MySQL.

- Led full life-cycle of company's three main products, including Perl Application Server, Web Services Studio, Web Services Management and Infrastructure.
- Researched, designed and developed Web Services Management and Networking Enterprise Suite using SOA.
- Implemented WS-Security, WS-Routing and SSL support for networking components.
- Implemented JDO for Data-Binding requirements.
- Designed and Implemented web services security and permission layer.
- Developed Web Services-based build process and test suite using ANT/Axis/Workshop/TCL and SOAP::Lite.
- Implemented Java packaging and distribution system.
- Developed NT Services using C++ for company products.
- Provided training and support for company SE's deployed to New York, San Francisco, Virginia and UK.
- Managed development team to design fast, simple and easy to maintain code, enabling performance, flexibility and a foundation for future features.
- Used industry standard tools and techniques to meet demands of Fortune 500 clients, including Unix, Java (J2EE, EJB, JDO), Perl, Ant, Axis, XML and messaging technologies.
- Created an Open-Source project with Java SWING for HTTP/Web Services load testing.

Jaime Ryan, Senior Developer

Jaime Ryan has led the development of the core set of Web Services that are used to configure and manage the Fabric. These services are used for statistics, reporting, security, network management, and client-server commands. Jaime designed and created new network entities and client features and documented/supported creation of new entities for field personnel. Part of Jaime's development responsibilities were to ensure that Network Director Web Services met WS-Security, WS-Routing, and WS-Addressing standards, as well as WS-Interop recommendations, and were callable from BEA Workshop, Microsoft .Net, and SOAP::Lite. Network Director Services were built on industry standard development technologies: Java, JDO, XML Schema, SQL, Axis, Thinlet, and Ant.

During the development of Blue Titan Studio, a Web Services Integration Suite, Jaime built adapters for various databases (Oracle, DB2, MySQL, MSSQL), file formats, messaging systems (TIBCO, Talarian, MQSeries), and Web Services standards. He aided in the design and creation of the Studio client using a service-oriented client-server system. The Studio client was built rapidly using rapid prototyping languages: Perl, HTML, Javascript, etc.

Mahesh P. Sooriarachchi, Senior Developer

Mahesh Sooriarachchi has over 12 years of experience in software development, having developed a wide variety of applications for the consumer, scientific and enterprise markets. As part of Blue Titan, Mahesh led the development of the Network Director GUI Client. The client uses a set of core Web Services to retrieve and define policy parameters for the Fabric. XML configuration files enable a high level of flexibility and extensibility, allowing developers, VARs, and customers to change the "look and feel" of each dialog box, add new panels, even call new Web Services. Thanks to the SOA-oriented approach, customers, such as Pfizer and Overture, are able to add new entity types and meta-data to the client with minimal effort, essentially adding a few Web Services to the Fabric, and creating some XML files. Technologies used include: Thinlet, TinyLine SVG, kSoap, kXML, Oracle, Web Logic, Jetty, Postgresql, Java (J2EE, SWING, JSP, JDO), Apache, UML, Rational Rose, Mozilla Gecho, and C++.

Curtis Williams, Senior Developer

Curtis Williams has nearly 10 years proficiency in Computer Internetworking, Software Design, SDLC, hardware and Software Quality. His expertise includes planning and researching industry trends to drive business unit objectives. Curtis utilized RPC and DOC style web services to integrate disparate systems into Service Oriented Architectures. Recent duties included Ant XML based code generation tool, using JDK 1.3/1.4, J2EE v.1.3.1 application containers and toolkits for Java based client/server applications. BEA WebLogic Server 8.1, Jetty and Resin application servers were utilized to deploy solutions in a heterogeneous footprint. BEA Workshop, Microsoft .Net, and Mindreef Soapscope were utilized to develop custom client calls and web service wrappers to AXIS servers. He has up-to-date experience with WS-Addressing, WS-Routing, WS-Interoperability, and WS-Security. Curtis also has extensive skills with Project automation using LabView(C, C++), Java, TCL and Perl toolkits. In addition to direct web services experience, Curtis also has experience with web based access control and authentication via RADIUS, Database, Hashfile, LDAP, JMS and JAAS.

As part of his development work at Blue Titan, Curtis wrote custom SQL scripts and created ad-hoc DB queries for Oracle (8i, 9i,10g), MySQL, and many other commercial and open source databases.

Prior to working for Blue Titan, Curtis spent 5+ years with Routing, Bridging and Switching WAN/LAN devices and architectures. He is also an expert Unix/Linux system administrator and has used such tools as Perl, SOAP::Lite, and junit to automate Network Director's build and testing process.

Amine Nabi, Senior Developer

Amine role was to improve and refactor the router code-base, enabling local policy execution, such as XML transformations, and security.

- Designed and implemented asynchronous routing in infrastructure networking nodes.
- Enabled persisted queuing of message across Fabric using open source JMS compliant queue (ActiveMQ).
- Designed and implemented caching, pluggable parsers chaining, and pluggable authentication using JAAS.
- Implemented unit testing using C# Microsoft .Net for invoking the Network Director Web services.
- Used: Java, C#, Ant, Axis, Jetty, JAAS, SOAP, JDBC, XML, JMS, ActiveMQ, ASP.Net XML Web Services, JBuilderX, Microsoft.Net visual studio 2003, SoapScope, RegEx Coach, Commons project, NUnit, CVS, UNIX & Windows

Ashish Pandit, Senior Developer

Ashish was informally offered a senior development position in August 2004 to extend and improve Network Director Fabric Services. His background in the various Web Services standards made him an excellent candidate for moving our current Fabric services from RPC-style to doc-literal style, and to add WSRM support to Network Director. Unfortunately his hire date was delayed due to budget constraints and corporate restructuring. Despite the closure of Blue Titan's San Diego office, Ashish is still very interested in joining the team.

Ashish's background includes the creation of BPEL-based enterprise class business process orchestrating software for another start-up based in San Diego.

- Responsible for leading implementation of enterprise class BPEL (Business Process Execution Language) in Java/J2EE environment. Provided project management and mentoring to other team members. Used UML, OOP and Design Patterns.
- Developed web services that implemented various standards such as WS-Security, WS-ReliableMessaging, WS-Addressing, and Asynchronous communication.
- Designed and developed Rule Engine and Rule Manager using Java, Eclipse, XML Ant, JUNIT, AXIS and Tomcat, JDBC, MySQL.
- Key architect for designing web services oriented Awarepoint server. Established development procedures and environment.

Tools/Environment: Java, Castor JDO, Hibernate, Tomcat, Web Services, BPEL, Linux, Ant, Eclipse, CVS, jUnit, AXIS SOAP, JDBC

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